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PART 1:

Journal Name:	<u>British Journal of Applied Science & Technology</u>
Manuscript Number:	2013_BJAST_5391
Title of the Manuscript:	Geophysical contribution for the mapping the contaminant plume of leachate from rubbish dumpsite of Hevie, Benin
Type of the Article	Research paper

General guideline for Peer Review process is available in this link:

(<http://www.sciencedomain.org/page.php?id=sdi-general-editorial-policy#Peer-Review-Guideline>)

- This form has total 7 parts. Kindly note that you should use all the parts of this review form.



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PART 2: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<u>Compulsory</u> REVISION comments	Dear Editor, This paper "Geophysical contribution for the mapping the contaminant plume of leachate from rubbish dumpsite of Hevie, Benin" deals with a very interesting topic in near-surface electromagnetic induction and resistivity survey at dump site area. I found author's study interesting and would like to see it published. However, the authors have missed some important concerns about their work that they must first completely address in their revised version. Foremost is the consistency and integration of the contents. Authors message is understandable, but many of the sentences use phrases that would not common be used to the readers. Generally these errors are: - Lack of robust compilation between geophysical measurements and groundwater geochemical tests (i.e water conductivity, Chloride concentration if presents, etc.. .) - The structure of the some subtitle is chaotic and	



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	is not following the regular structure of a scientific paper. - The geophysical data interpretation and inversion are not addressed well. - Source of errors in the implemented geophysical methods. - The references are not well addressed and missing consistency. -Figure are need to be reproduced in a very good resolution including valuable contents. -Authors need to see up-to-date references for certain topics, like joint application of ER and EM in hazards wastes type. Also there is a conceptual error that is observed along all the text that is considering and adopting a fact based on very limited test. e.g. Well tests. Because of these errors I think that the paper must be improved at level of major revision and I'm looking for an revised version that can be reviewed correctly. Anyway as it looks an interesting case study I was checking the text and I suggest some comments to the authors if they want to send a new improved version to the journal.	
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	1. Introduction Line 27, see reference: (V. Naudet & al 2004). Line 29, see reference: (V. Naudet & al 2004). Line 23-33 the borehole measurements are invasive and can perturb local equilibria , please clarify this sentence to what it meant for. Line 42-43 see references; (F.A. Monteiro Santos, António Mateus, Jorge Figueiras and Mário A. Gonçalves 2006). Lines 43-45, These studies are possible because both organic and inorganic chemicals can cause a large variation (usually a decrease) in the electrical resistivity of the earth material (Palacky, 1988; Aristodemou and Thomas-Betts, 2000)., rewrite this sentence , address what is /are the differences between organic and inorganic effects on earths resistivity. And avoiding usually a decrease. Line 47 see reference (Yalo & al, 2012). Line 49-50 see reference ground. (A. Revil, V. Naudet and J. D. Meunier, 2004). 2. Location and hydrogeology of study site Lines 68-73 I suggest to combine figure 1 and 2 and present it as figure 2 , the resolution is very	Ok Ok Ok Ok Ok Ok
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	bad and I can barely read the contents, the three hillocks areas must be presented with single line type. However, I couldn't see where the wells are? Too many information but lacking coherency, present what is useful for your study. Line 91, figure 3 need a reference and if possible to re draw with high resolution (i.e 300dpi, tiff format and cypk compression type). Line 92-93: the power of the aquifer varies between 25 and 33m. Rewrite this sentence. 3. EM and ERT principles of measurement Lines 96-128 . the type of given information is technical rather than scientific, most of this information would be useful for a user's manual, not for a research paper. I mean the authors must present why they used joint application of both methods. In addition, they must focus on the sensitivity of measurements using two methods on same case study. e.g. why using Wenner array, vertical dipole. The selected frequencies used in EM based on what? . I would like to see more references on this section. No need for EM's photo and figure 4.	Ok Ok Ok Ok
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	Line 98 see reference [Mark, E. Everett 2012] 4. Study methods Lines 133-134 see fig2, fig 5 use capital letter and check the whole manuscript for the same purpose. Line 135 four surveys , of what type , explain the categorization of survey and based on what? Figure 5 , the index is larger than the map information , make it readable and increase the resolution as well. Line 156 The Archie's equation must be decomposed for the reader to understand it s components, however I found authors approximation based on this formula is very weak when using one well measurement. Besides making a very sharp and sensitive decision about the limit of aquifer contamination using 340 ohm.m value is not acceptable. Further, measurements need to be taken if available to narrow down uncertainty. Such data were presented in figure 7. Line 157: the authors should explain how do obtained 'a 'and 'n 'values; either experimental or by laboratory test.	Ok Ok Ok Ok
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	5. RESULTS AND DISCUSSIONS The authors must present some data limits and statistics about the EM34 measurements for the four areas namely, S1, S2, S3, and S4. Looking into Figure 7, S1 and S4 present critical subsurface condition at 340 ohm.m. The subsurface geological condition as I understand is most likely uniform (line 81 fine sands to coarse, gravels by places and clayey sand, also see lines 255-258 –the water table is around 18m depth (figure 10). As a result authors have explained these variations on this section based on data results and I would like to see some fact using other available information rather than speculation at some paragraphs, e.g. lines 220-228. Fig9 a, and b. the ER inverted sections present a wide range of resistivity values ~ 0.1 to 6000 ohm.m. The highest value is below the hillocks of rubbish? It is important to see three sections for each figure; observed, calculated and inverted-section. The author's should mention the forward model parameters they considered and why? Such that when producing long ER tomography section which extends to about 400m length. Looking into ERT section, It seems that the topography of the area is flat, is this true?	Ok Ok No
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	6. Discussion Line 267-269 rewrite this paragraph" In rainy season, period of the realization of the study, the level of the ground water of the Terminal Continental is on its higher oscillating level between 15 and 18m from the surface of the ground" . Figure 10 , the RMS value is too high, this why wee need certain forward model parameters. This is to simplify the geological condition, since the manuscript states the geology is simple.	Ok Ok
<u>Minor</u> REVISION comments		
<u>Optional/General</u> comments		